

Modern Grid Metrics

Presented by Joe Miller, Modern Grid Initiative Team

Modernizing the Grid Southeast Regional Summit

August 11, 2006

What is a Modern Grid Metric?

MODERN GRID
INITIATIVE

- **Measurable**
- **Easily monitored**
- **Can be trended**
- **“Drill-down capable”**
- **Has a quantified target that defines success**
- **Drives desired behavior**

➤ **Standard considerations for any metric...**



Office of Electricity
Delivery and Energy
Reliability

- **Modern Grid Team brainstorm and present some examples for consideration**
- **Solicit stakeholder input**
 - Results from past summits
 - Discussion group participation (today)
 - Website interaction
 - Working Group reviews
- **Consider best practices by others**
- **Post metrics on website**

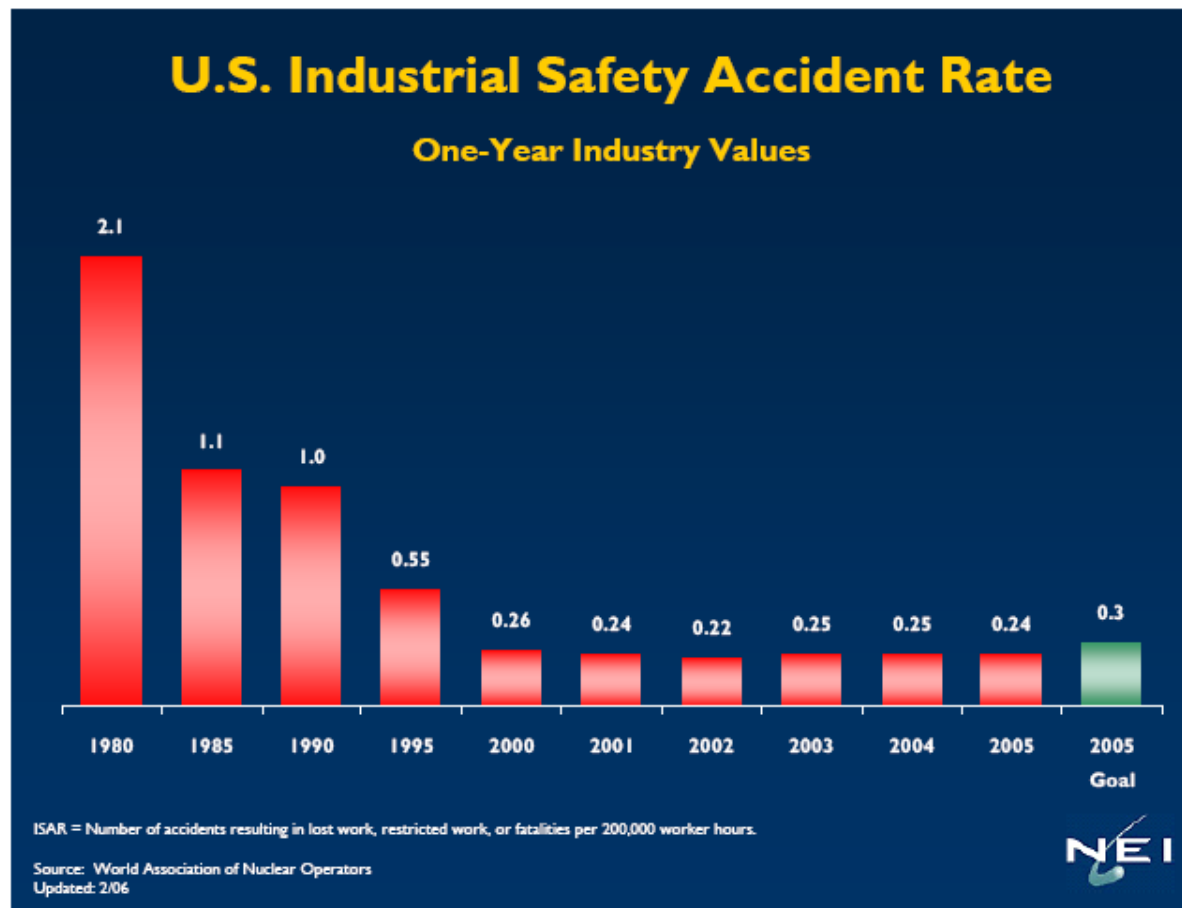
Example - nuclear power performance indicators



Office of Electricity
Delivery and Energy
Reliability

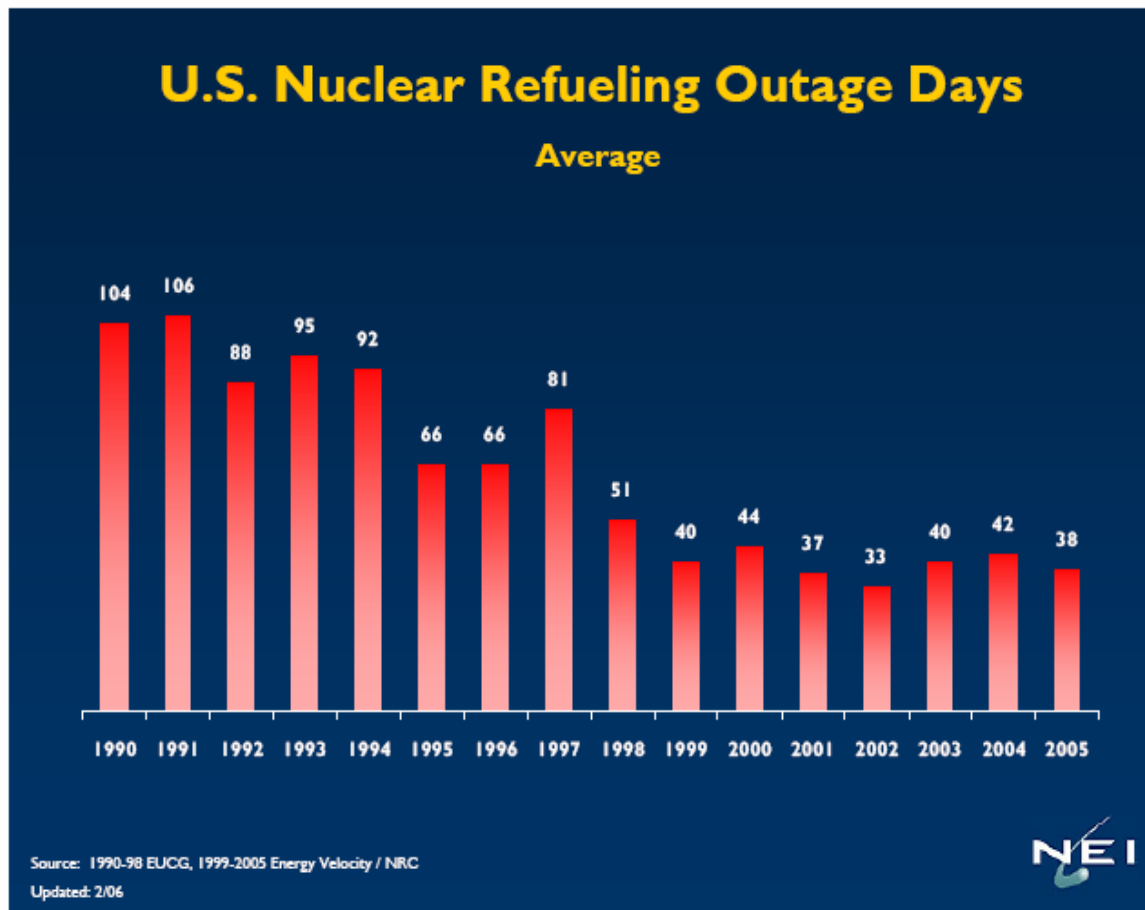
Nuclear Power Performance Indicator - Example

MODERN GRID
INITIATIVE



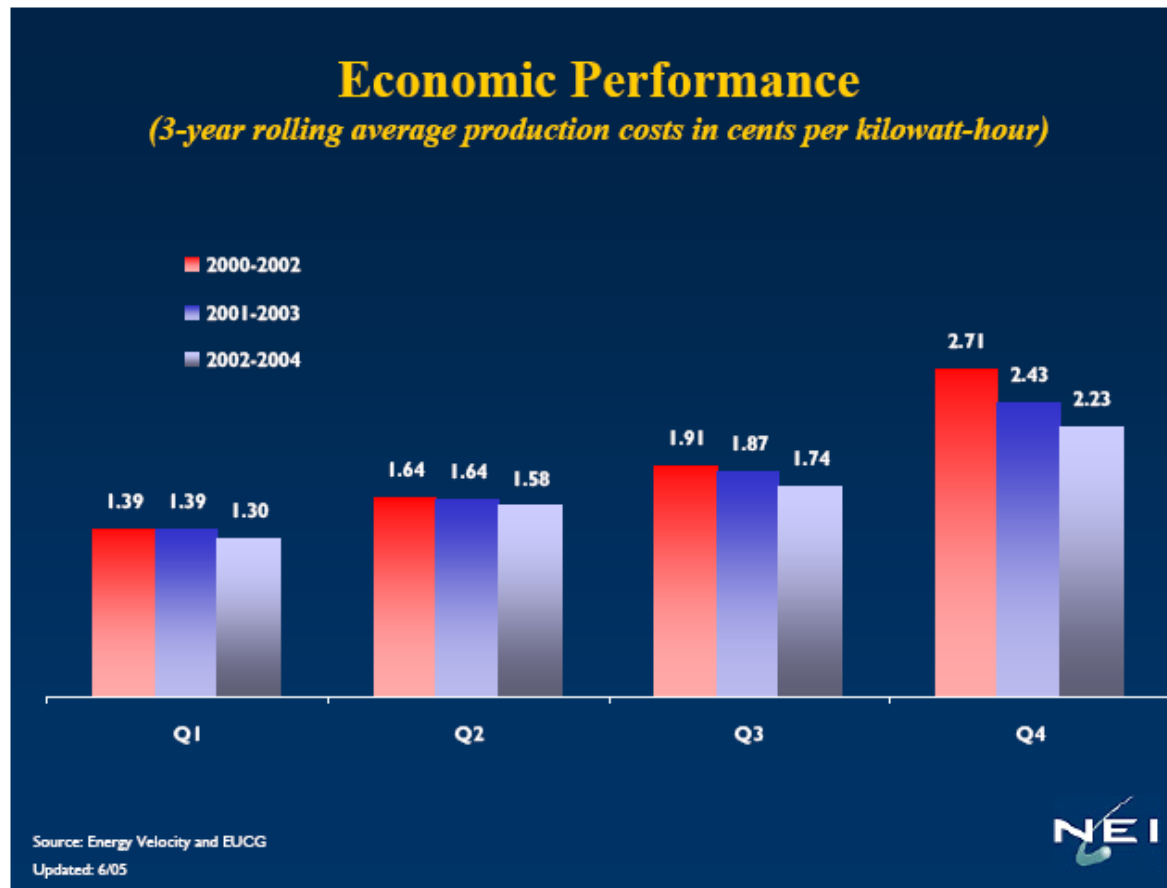
Office of Electricity
Delivery and Energy
Reliability

Nuclear Power Performance Indicator - Example



Office of Electricity
Delivery and Energy
Reliability

Nuclear Power Performance Indicator - Example



Office of Electricity
Delivery and Energy
Reliability

What are the Desired Results?

MODERN GRID
INITIATIVE

The Modern Grid is:

- Reliable
- Secure
- Economic
- Efficient
- Environmentally friendly
- Safe

These are the goals!



- **Industry reliability indices**
 - CAIDI (outage duration - average customer)
 - SAIDI (outage minutes/year - average customer)
 - SAIFI (outages/year - average customer)
 - Power quality indices
- **Cost of interruptions**

- Reduce CAIDI by 50% in 10 years
- Reduce SAIFI by X% in 10 years
- Reduce cost of interruptions by 80% by 2020



Office of Electricity
Delivery and Energy
Reliability

- **Diversity in generation**
 - Average size of generating units
 - Number of generating units < x MW
- **Fuel Diversity “index”**
- **Restoration time**

- Increase decentralization of generation to 25% of total KWh generated in 10 years
- Increase KWh generated from renewable sources to 50% by 2025
- Number of outages caused by malicious acts (trend only)



Office of Electricity
Delivery and Energy
Reliability

- **Energy prices**
- **Capacity prices**
- **Peak energy prices**

- **Reduce Average Energy Prices by X% by 20YY**
- **Reduce Peak Energy Prices by X% by 20YY**



Office of Electricity
Delivery and Energy
Reliability

- **Peak demand**
- **Transmission congestion costs**
- **Utilization factor for T&D components**
- **System losses**
- **O&M unit costs**

➤ **Reduce peak demand by 20% by 2015**

➤ **Reduce transmission congestion costs by X% by 20YY**



Office of Electricity
Delivery and Energy
Reliability

Environmental Metrics – Some Examples

- **Emissions (CO₂, NO_x, SO_x)**
- **Renewable sources**
- **Asset Size**

- **Reduce emissions by X% by 20YY**
- **Increase KWh generated from renewable sources to 50% by 2025**
- **Reduce environmental footprint by X% by 20YY**



Office of Electricity
Delivery and Energy
Reliability

- **Standard OSHA indices**

- Reportable cases
- Lost time accidents
- Fatalities

- **Public injuries**

- **Public fatalities**

- **Reduce number of utility worker fatalities by 90% by 2015**
- **Reduce lost time accident rate by an order of magnitude by 20YY**



Office of Electricity
Delivery and Energy
Reliability

- **NE Summit identified 39 metric ideas**

– Reliability	19	49%
– Security	10	26%
– Safety	4	10%
– Environmental	3	8%
– Economics	3	8%
– Efficiency	0	0%
- **13 metrics had high level of consensus**

– Reliability	9
– Security	4
- **Metrics related to outages/ interruptions are receiving most of the attention**
- **Need more feedback on other metric categories**



Office of Electricity
Delivery and Energy
Reliability

- **Fewer vs. many metrics?**
- **Cost to achieve metric target?**
- **Interdependencies among metrics?**
- **Conflicts among metrics?**
- **Process for monitoring and communicating periodic results?**
- **Who takes ownership of the metrics for the industry?**



Office of Electricity
Delivery and Energy
Reliability

- **Brainstorm using “Clean Sheet of Paper”**
 - What are your expectations for the modern grid in each assigned metric category?
- **Recommend top 2-3 metrics and targets for each category**
 - “Reduce parameter by amount by when”
- **Report out your results**
- **Volunteer as a Working Group member to assist us further refine the process**

We need your involvement!



Office of Electricity
Delivery and Energy
Reliability